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ART. I.— *Some Hints on the Advantage of Winter Pruning of Fruit and Forest Trees.* By MR THOMAS WILLOT, Boston.

MR J. BRECK — *Dear Sir* — Having proved the advantage of the remarks I about to make on the winter pruning of fruit and forest trees, I submit them for insertion in your Magazine.

It is well known that little can be done in the Horticultural department, as relates to out doors culture in the winter season in the Northern States ; and it is also the opinion of many persons that *hardy Fruit and Forest Trees* can be pruned with safety only in the spring; for my part, I see no reason why all kinds of hardy fruit and forest trees cannot be pruned in the middle of winter, every fine day ; nor, do I ever recollect of seeing any trees injured by winter pruning, when judiciously done. The only advantage that I am acquainted with in spring pruning, is, that the wounds heal sooner than in the winter ; but, on the other hand, it is necessary to apply a composition on the amputated part, to keep the sun from cracking, and the rain from decaying it; there may be, also, another *item* in favor of late spring pruning, namely ; the small dead branches are more easily seen than in the winter.

I will now endeavor to point out the advantage of winter pruning. In the first case it places you in a forwardness for the spring work,

ploughing, digging, and preparing the ground for spring cropping, which may be considered an important point, in a country like this, where the seasons come on with such rapid progress in vegetation.

The destroying of insects is also another important point in the the culture and well being of fruit trees, which is effected by clearing and washing the outer bark, a process that I have reason to believe, can be done more effectually in the winter than in the spring. The bark of trees is the best winter quarters for insects in a dormant state, and to breed in, which, being exposed to the winter's severity, they eventually perish. I would recommend that great care be taken in scraping off the loose outer bark of fruit trees, so that the inner bark is not injured by the operation, as I am fully convinced, that many trees are often more injured in this respect, than by winter pruning.

In the operation, care must be taken to remove all the loose outer bark, by scraping it from the tree so as not to injure the inner bark. Any large amputations or wounds made, should be pared smooth with a sharp knife, to which the following wash may be applied, viz: equal parts of clay and cow-dung, well mixed and composed together, and a moderate portion of potash added therewith. This may be applied also to the *cracks* and *wounds*, and should be made of such a consistence as to be applied with a *hair brush*; but, if the trees are very badly *infected with insects*, I would recommend the same composition, made into a thinner consistence, mixed with a quantity of the wash generally used for destroying the mildew on the grape vine, made of lime and sulphur, in the following proportions, viz: to eight gallons of the before named composition add one pint of the wash, which, apply to the bark of the trees in a thin, regular manner with a *brush*, after the outer bark has been cleansed as before directed.

In closing the above article, I cannot refrain from impressing upon the minds of those persons who have fruit and more especially *forest trees* to prune, the advantage to be obtained by winter pruning. I hope they will be induced to try the experiment, and trust the results which follow will be a satisfactory proof of the utility of the process.

Art. II.—*On Pruning Timber Trees, &c.* Extracted from Professor Lowe's Elements, &c.

[The subject of pruning timber trees has not received much attention in this country generally, as the great object has been in most places, to cut down and destroy, rather than preserve, the beautiful woods and groves which were the pride and ornament of our land. The barren aspect of many parts of our country for the want of shade trees has been calling the attention of horticulturists for a number of years to supply the deficiency, by transplanting from the woods and nurseries, many of our fine native trees, to ornament their grounds, and the roadsides; we believe the time is not far distant when large plantations will be made not merely for ornament, but for timber which will soon be in great demand. The following extracts, we conceive, will be acceptable to those who are engaged in a work so honorable to themselves and beneficial to the community, as that of cultivating timber and shade trees.—Ed.]

The natural tendency of many trees is to rise with a conical stem shooting forth lateral branches from the base upwards. Some species of trees as most of the resinous and some of the willow and poplar kind do not tend to deviate from this form, the main trunk rising erect, surrounded from the summit to the base by smaller horizontal branches. But other trees, and these may be said to comprehend the greater part of the hard wood, do not rise with the same regularity. Instead of one leading upright trunk, they send out many large boughs, which rival in size the principal trunk: such trees become forked near the base, and the principal trunk below is short, while the top is largely branched.

Now this is a form of a tree which, however conducive to beauty, is not so to utility. The main object for cultivating wood is for the timber, and the greater part of the useful timber of trees is contained in the trunk before it begins to shoot out into boughs. In the artificial cultivation of wood, therefore, it is important to produce as great a length of trunk, in proportion to the branched top, as a due attention to the natural habits of the tree will allow.

Further, it is important for the obtaining of useful timber for the purposes of the carpenter, that the trunk shall be what is termed clean for as great a space upwards as possible. To understand the meaning of this term, when a branch shoots out from the side of a trunk of a tree, a part of the vegetable circulation is carried on through

that branch; and hence there is at this place an interruption of the continuity of the circulation and this alters its course. The fibres of the branch lie in a different direction from those of the main stem, and this, when carried to a certain extent, is injurious to the texture of the wood. These twisted fibres frequently constitute as it were a distinct mass of wood within the body of the trunk. They often form what are called knots, which greatly take from the usefulness of the timber for the purposes of carpentry.

For these reasons, it is important that as great a part of the lower trunk as possible, be freed from the lateral shoots.

Nature in part performs this process. As the tree rises in height, the lower branches decay and fall off, so that there are few trees in which, even if left to themselves, there will not be a certain portion of the lower stems, cleared of lateral branches. When trees are close together, this natural falling off of the lower branches takes place more quickly, and to a greater extent, than when they are distant from each other.

In natural forests the trees rise with very tall upright stems, and are gradually divested of all their branches below to a vast height. It is from natural forests accordingly that our finest, tallest, and most valuable timber is derived.

But in the artificial culture of wood we cannot imitate the natural process, and allow the lateral branches to fall of by themselves. In the culture of wood we must admit air to the trees, by keeping them at a distance from each other: and under these circumstances, the tree tends greatly to shoot out into branches, and thus to produce a smaller growth of upright stems, as well to have a smaller extent cleared of branches towards the base.

In the cultivation of wood, then, we must generally resort to artificial means to form the tree to what we wish it to possess. We must then endeavor to promote the upright in place of the lateral extension, and then to have a sufficient portion cleared of lateral branches.

Further, the later branches should be taken off at as early a stage in the growth of the tree as is consistent with its health; for it is to be observed, that when a branch shoots from a tree, the twisting of the fibres begins at the point where the branch had originated, and not, as from a cursory inspection might be supposed, from the surface of the stem.

Thus, in a following section of a portion of the stem, a lateral branch having first appeared on the surface, continues to increase in thickness as the main stem increases, and in the same manner, namely, by the adding each year of a layer of wood all round. It does not therefore commence at the surface of the tree, but in the interior and each year increases in diameter. The sooner, therefore, that this branch is removed, the less will be the twisting of the main stem at this part.

As in the practice of pruning there are two distinct purposes to be aimed at; first, giving the vertical tendency to the tree; and, second, obtaining as great a portion as possible of clean stem; so there are two periods in the growth of the tree at which these objects are to be attended to. The first in the order of time, is giving the vertical tendency to the tree, and the second, the denuding it of its lower branches.

Until the tree has attained the height of fifteen or sixteen feet, the only object that need to be attended to is to give it the upright tendency in question, and to prevent its becoming forked.

The pruning for this purpose consists in merely shortening such branches as may be rivalling the leading shoot, or stretching out laterally with a growth disproportioned to that of the others. Frequently the mere nipping of the terminal bud will be completely effected by shortening the shoot, making it about half the length of the shoot above; this is the sole purpose of pruning during the first period of the growth of the tree; and it is to be observed, that if a tree be of itself tending to grow upright and without forking, no pruning, even of this simple kind, is required. For of all pruning it is observed, that it is a violence done to the plant, and is to be avoided as much as possible. By cutting off branches and leaves, we cut off organs of nutrition. We do not prune that we may increase the quantity of wood, for the operation has quite a different tendency and effect; but we prune that we may give the tree that form which is calculated to produce the greatest quantity of timber in the proper place.

The other branch of pruning, and next in the order of time, consists in denuding the lower part of the trunk of branches, so that there may be obtained a sufficient extent of clean wood. Although, for the reasons given, it is important that the taking off these brances be at as early a period as possible, yet this must be done always un-

der the conditions necessary to preserve the health of the tree. The tree should in the first place, have attained sufficient strength and age to bear the being deprived of its branches; and in the next place, the process should be carried on so slowly as not to affect the healthy growth of the plant, and so gradually, that it may have vigor to cicatrize, or cover with bark, the wounds that have been made upon its surface. The period when we may safely commence this process of denudation, is when the tree has attained the height of fifteen or sixteen feet.

Now, every tree adds to the length of its leading shoots and branches from buds which grow on the end of the shoots. Every year a new shoot is made from the end of the buds, of a length proportioned to the vigor of growth of the plant. The shoots thus formed in one year, produce each a bud, which, in like manner produce shoots in the following year; and thus while the tree is growing, there is a continued increase of the length of its leading shoots and branches. Further, when the annual shoot of any branch is produced, there is usually sent forth at the place where it originates one or more lateral shoots, so that there is a succession of branches, or tier of branches from the base to the summit. Were these lateral branches not to fall off, we could, by means of them, ascertain the age of the tree, and in the case of many of the Coniferæ, we can frequently ascertain the number of years which they have lived, or that each individual branch has taken to grow, from the number of these annual shoots alone. A knowledge of this mode of growth will conduct us to a simple rule in practice for removing, without violence, the lower branches of the trunk.

When we commence this process of pruning off the branches of the stem, let us cut off the lowermost branch or tier of branches, that is, the branch or branches of one year's growth, and no more: in the second year let us cut off a second tier, in the third year a third tier, and so on. In this manner, while the tree in each year makes one shoot vertically, the lateral shoot of another year is cut off below. Thus, a tree having made fifteen shoots, and having risen, we will suppose, to the height of fifteen feet, we commence the process of pruning by cutting off the lowermost set or tier of branches. The tree then makes a shoot at the top, so that while we have cut off the lateral shoots of one year, another year's vertical shoot will be made. The next year we prune away the branch or

tier of branches, and again the tree makes a shoot at the top. In the third year we cut off as before, and again the tree makes a shoot upwards; and so we take off each year the lateral shoots of one year, and never any more.

By this method we shall gradually denude the stem of its lateral branches from below upwards, while it is increasing in vertical growth. The extent of clear trunk will thus gradually become larger in proportion to the uncleared portion or top. Thus, suppose we begin to prune when the tree has made fifteen years' shoots, then when it has made thirty years' shoots, we shall have cleared off fifteen; that is, half the height of the tree.

Now, when we have cleared half the height of the tree, or a very little more, we should pause in our further operations, and mark its state of growth. If it continue to grow vigorously, we may resume our operation of close pruning, but at longer intervals than before, so as never in any case to have cleared away more than one half, or at the utmost three-fifths, of the height of the tree, and never taking off more than one year's lateral growth of branches in a season.

Every tree, it is observed, must possess a sufficient top; that is, it must extend horizontally as well as vertically, so as to bear branches and leaves. The leaves are organs of nutrition of the plant, essential to the healthy exercise of the vegetable functions, and we must be careful to deprive it of no more of these organs than consists with our purpose of pruning. Now, by proceeding slowly in this gradual manner, never taking off more in one year, than the growth of one year's lateral branches, we shall not usually interfere with the healthy growth of the tree, but shall always leave it a sufficient power of expansion at top, as to afford it the means of nutrition and growth. Further, by never cutting off more at a time than the growth of one year, the tree will generally have vigor to cicatrize the wounds that have been made upon its trunk; whereas, were we to lop off many branches at a time, according to the practice too prevalent, the tree might not have vigor to cover them with fresh growth of bark, and thus the wounds might remain, to the lasting injury and frequent destruction of the tree.

In pruning in this manner the branches are to be cut off quite close to the stem, so that the bark may quickly cover the wound; and although trees may be pruned in summer, the fittest period for

pruning, as of all operations upon the living plant, when vegetation is inert: that is, from the fall of the leaf, to the period of the ascent of the sap in spring.

Thus, then, the operation of pruning may be said to be begun in the nursery, but at that time with an extreme degree of temperance, all the object of pruning at that early period being to prevent the plant becoming forked. When the trees are transplanted to their ultimate situation, we may examine them in the third, or at latest, the fourth year afterwards, and then, if more than one leading shoot is formed on any tree, we are to select the best, and shorten the others to about half the length of that which had been selected. And in like manner, when any branch or set of branches is seen to be extending laterally, with a growth disproportioned to that of the others, then, by merely shortening them, the tendency to the lateral extension will be sufficiently checked to allow the other branches to extend in an equal degree. And should we find that all the branches of a tree are tending to extend too much laterally, by merely shortening them in a slight degree, we shall give the ascendency to one leading shoot, and so promote the upward tendency: and this is all the pruning required until the tree has attained, as has been said, the height of fifteen or sixteen feet, when the process of pruning the lower branches is to be begun and carried on by the slow process described. But even after we have begun the process of close pruning, we may still observe that the tree is ascending vertically, and, if required, give this tendency from time to time by shortening of any of the lateral branches.

It is not essential to the success of this method of pruning, that it be carried on every year. It will be sufficient to approach as near to the perfect practice as circumstances will allow, observing merely the general rule that not more than the growth of one year shall be taken off at a time, and that the process shall not be carried further than to the clearing off three-fifths of the height of the tree.

The method of pruning by the shortening of the lateral branches, was brought into notice in England by the writings of Mr Billington, who had charge of a portion of the royal forests: and it was further developed and explained, with the addition of the gradual denudation of the lower branches, by Mr Cree, in Scotland. To these most deserving individuals is due the merit of having introduced, and to the latter that of having perfected, a system of pruning greatly superior to that which had been before in use.

Pruning, as it is commonly practised, can scarcely be said to be founded on any principle. Branches are lopped off without limit or caution, and thus the growth of the tree is injured, and wounds formed upon its surface, which are never afterwards cicatrized. Often in the case of the young trees, we see the entire branches of successive years' growth loped off in a season, and nothing left but a bush at the top. By this system of mutilation, millions of trees are sacrificed. A great proportion indeed of the whole cultivated wood of the country is annually destroyed, and it were better that the pruning knife were never used at all than thus misapplied. The practice so common has probably been derived from that of the garden; but it is to be observed, that in the garden the object of pruning is to repress the growth of the wood and produce that of fruit; and the principle, therefore, is in no degree applicable to the pruning required in the forest.

The principal instruments to be employed in pruning are a sharp knife, chisels with handles for reaching the higher branches, and sometimes a small saw for the larger branches. The hatchet is on no occasion to be used in pruning. The Indian saw ought to be used, which is made to act by being pulled towards the operator, in place of being pushed away from him like the common saw of Europe. By being fixed to a long handle, this instrument is adapted to the cutting off the higher branches.

When the proper direction has been given to the growth of the tree, and the lower branches have been pruned to the height to which it has been thought expedient to carry the operation, art has done all that it can do to render the tree useful. The natural growth of the tree must effect the rest. The trunk will increase in diameter by the addition of concentric layers of wood, yearly formed between the bark and the stem. The longer a tree stands while in a growing state, the thicker will its trunk become, and the more valuable. It makes wood rapidly, to use a familiar expression, when the trunk has become of a good size: and it is an error, therefore, to fell wood which is intended for timber too soon.

In the pruning of forest trees, one of the most frequent errors committed is to delay the process till too late. By this delay the form of the tree is rendered such that it cannot be restored; and the lopping off of large branches in the manner often practised, in order to give the tree a better shape, is for the most part attended with the

evil of disfiguring it more, and enfeebling its growth. We constantly see those mistaken attempts to repair past neglect, by the lopping off of large limbs, the places of which the tree now wants vigor to heal. Vast number of trees are destroyed by this system of mutilation, when all further object in pruning is at an end. Sometimes a large branch may be lopped off a tree top heavy, or when a branch is likely to be split, or for some other good reason. But it is an error which must end in disappointment, to begin this system of lopping a full grown tree, with the design of compelling it to resume its process of increase when it has naturally ceased.

When a tree has naturally been neglected, but is not yet so far advanced, but that we may hope to restore it, we have merely to apply the principle of pruning explained to the case of the particular tree. We have to shorten the lateral branches which are forming forks, so as gradually to produce the upright tendency of the leading stem required. The rule is to proceed with the greatest temperance, taking care never to do too much in one season, lest, by depriving the tree of its branches, we enfeeble its vigor and impede its growth.

Art. III.— *On Live Fences.*

Live Fences are annually becoming more and more a matter of interest to the American public, particularly to the farmers of the Prairie West, where there is already a scarcity of timber land. Our fencing timber is rapidly diminishing, and but a small portion of our country is furnished with stone for fencing purposes. Live fences, therefore, must be sooner or later resorted to, as a matter of necessity, and they may be resorted to, we are persuaded, as matter of ultimate economy, in districts where fencing timber or old stones are scarce or dear. Caleb Kirk, of Delaware, a writer of some excellent articles upon hedges, states in one of his essays, that an Englishman, located in his neighborhood, was in the habit of contracting to plant and take care of thorn hedge till it became an efficient barrier to cattle, receiving his pay as the work progressed, at one dollar the rod. In a period of twenty years, therefore, the live fence would cost much less than the dead fence, with the ad-

vantage to the former superadded, that at the end of the twenty years, the live fence would be complete, and in order, while the dead fence would be required to be rebuilt with a new outlay. We are satisfied from our own experience and observation, that we have abundant materials, in the indigenous growth of our country, for live fences, and that we can, after we have profited more from experience,— and the sooner we acquire this the better,— advantageously employ them in growing live fences. The greatest bar to our progress in the business is, *want of patience*, and a just perception of our ultimate interest. If we could grow live fences as readily as we can construct dead ones, there would be no hesitation in resorting to them, however expensive. But the idea of devoting six or seven years to bringing them to perfection, *perhaps longer than our natural lease of life*, deters many from planting hedges, as it does fruit or ornamental trees. The object of the parent is almost invariably, not to provide the means of promoting his own comfort, but to lay up an inheritance for his children, and this, he should consider, is as effectually done by enhancing the value of the acres, which are to constitute the patrimony, by good and permanent live fences, orchards of good fruit, and rural embellishments, as by bank bills or wild lands in the far west. Live fences not only serve to enclose lands, but afford a highly beneficial shelter to farm crops, and, if kept in order, add greatly to the beauty of the landscape.

In the few remarks we are about to offer on this subject, we shall direct the readers attention,

1. To the material to be employed,
2. To the procuring the plants,
3. To the preparation of the ground and planting; and,
4. To the management of the hedge.

The Material to be Employed. The best material, we believe, is the thorn (*Cratægus*) most indigenous in the district where it is to be used — because such species must be best adapted to the climate and soil. The American thorn is generally of stouter growth than the European, which in the old continent is used for hedges, at least with us, and is equally well armed with thorns. Of the native thorn, nine species are enumerated by botanists, viz:

1. *Cratægus coccinea*, berries large, red and pleasant tasted, and grows from Carolina to Canada. Two varieties.— *Eaton*.

3. *C. pyrifolia*, (pear leaved,) grows from Pennsylvania to Carolina, west to Michigan.— *Beck*.

3. *C. populifolia*, (poplar leafed,) grows in Pennsylvania, &c. berries small and red.—*Eaton.*

4. *C. elliptica* — berries oval, five seeded, small, red — grows from Canada to Carolina.— *Beck.*

5. *C. Glandulosa*, (full of kernels,) fruit scarlet, middle sized, oval, five seeded. Canada and Allegany mountains.— *Ib.*

6. *C. flacea*, (yellow berried,) grows in Vermont.—*Eaton.*

7. *C. punctata*, two varieties, one having red and the other yellow berries. Tree dwarfish — grows from Carolina to Georgia.— *Beck.*

8. *C. crus-galli*, fruit small, red, mostly one seeded. Long spines — grows from Canada to Carolina — several varieties.— *Beck.* Var. *splendens, pyracanthifolia*, and *salisifolia*.— *Eaton.*

9. *C. parviflora*, (small-flowered,) fruit large, yellow, with five bony one seeded nuts — grows four feet high, from Canada to Carolina, in sandy woods.

The *C. Oxyacantha*, or quickest thorn of Europe, has been introduced, and used to some extent among us; but we do not think it is so well adapted to our climate, particularly north lat. fortytwo deg., as our native species. After a trial of seven years, we have been obliged to give it up, and have substituted native plants in its stead.

There are besides the foregoing, several other plants, which have been recommended and partially employed in live fences. Among these we may name the following:

1. *Red Cedar*, recommended by the late John Taylor, of Virginia, and others. We have seen this plant in hedge in Maryland, but have never seen it make a good hedge.

2. The *Wild Crab*, though we have not seen it tried, seems well adapted for live fence — being hardy and well armed with spine.

The *Honey* or *Three Thorned Locust*, (Gleditschia triacanthos,) though belonging to the class of large trees, yet by close planting and judicious clipping, may be kept to a dwarf size. The male plant is armed with very long and strong spines, the female plant has fewer and smaller spines, and bears an abundance of seeds. The plant is said to be indigenous to the country south and west of New Jersey, and is found to be hardy in lat. fortytwo deg. N. We are experimenting with it as a material for hedges, and our confidence in it is becoming stronger as we progress. It is of rapid growth,

and will require clipping probably twice in a season. It will ultimataly make a very strong fence, if properly trained in time.

4. The *Buck Thorn* — (Rhamnus catharticus.) This may be termed a small tree, or large shrub, producing an abundance of black berries, often used medicinally as a cathartic — not armed with spines, but growing very close and compact. We long doubted whether this would make an efficient fence, till we were undeceived by a visit to E. H. Derby, Esq., of Salem, Mass., where we saw one of the most beautiful and efficient hedges that ever met our eye, formed of the Buck thorn. We purchased a thousand plants, and now have them in training as a hedge. We apprehend it will require a longer time to make them a strong fence, than from the other plants we have enumerated.

5. *Privet* or *Prim*, (Lagustrum vulgare,) an exotic shrub, growing six to eight feet high, without spines, for the last ten years perfectly hardy in the neighborhood of Albany — branches very dense, and retaining their green foliage often to midwinter; makes a beautiful *ornamental* hedge about court yards and gardens, when symmetrically clipped, and a very *useful* one, in time, if we are to credit the reports of our grandfathers: for in olden time, prim hedges were extensively cultivated among us, particularly on Long Island, in Connecticut, &c. In two towns of Suffolk, according to Mr L'Hommedieu, there were no less than four hundred miles of prim and black thorn hedges some sixty years ago. The cause of their sudden and general decay, at that time, has never been satisfactorily explained; yet we are certain of the fact, that for the last fifteen years the prim in this neighborhood has proved perfectly hardy, and has not been affected by any disease or insect enemy. It possesses one advantage over all the other plants we have named: it grows freely from cuttings, which may be readily transported hundreds of miles, in winter, with safety.

6. The common *Beach* is extensively employed in the Netherlands for hedges. They are beautiful and strong, the plants being trained alternately right and left, diagonally, resembling lattice work, though the labor in training is considerable. Beach mast may be had in any quantity in the north and may be readily transported.

7. The *Osage Orange*, (Maclura aurantiaca,) is strongly recommended as a suitable plant for hedges in the southern and middle

3. *C. populifolia*, (poplar leafed,) grows in Pennsylvania, &c. berries small and red.—*Eaton.*

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states. Although a native of the south-western states, we are disappointed in not finding it noticed by either Eaton or Beck. It forms a tree of the second class, is armed with strong spines, and has a tolerable thrifty growth; it will not bear our northern winters, but we think may be cultivated south of the Highlands, or lat. forty.

8. The *Cherokee Rose*, we are told, makes a beautiful hedge in the southern states, but we do not learn that it will succeed north of Maryland.

9. The last plant we shall name is the *Japan Quince*, (Cydonia formerly Pyrus Japonica.) It is a shrub growing six to eight feet high, abundantly armed with spines, handsome foliage and splendid scarlet flowers — a native, as its name imports, of Japan. The wood is hard and the branches close, and after a few years a hedge of it would become impervious to cattle and hogs. It is cultivated in shrubberries as an ornamental plant, on account of its bright scarlet flowers. Another species has white flowers. This plant may be rapidly multiplied, by cuttings of the root.

The *Elm*, although ranking among the first class of forest trees, seems to us adapted to this purpose, particularly the species commonly known by the name of slippery elm, (Ulmus fulva, of Michigan,) which is smaller in its growth than the common American kind. Although this plant is not armed with spines, the common requisite of a hedge plant, its branches and top are so flexible that they may be readily bent to a horizontal, or recumbent position, and interwoven with each other, without materially obstructing their growth; and when once interwoven in this way, and the fence having attained a proper height, they present a barrier to the strongest animals. Some plants accidentally mixed with our honey locusts, have given us a high opinion of their fitness for hedges.

Another plant which is used considerably in Europe, in wet grounds, and which may be found useful in like grounds here, is the *Alder*, (alnus;) but this is calculated to succeed best here, as it does there, planted on a bank and ditch. On grounds natural to its growth, the *White Birch*, (Betula alba,) cannot fail also of succeeding well. We have seen tolerable fences made of this plant, by merely lopping them in a line; and if they are planted and trained, they must make a fence.

2. To obtain Hedge Plants. The most certain mode is to plant the seeds, and to raise the plants in nursery beds. Plants of

the indigenous thorn, and of the red cedar, may often be obtained in large quantities from the pastures and woods. We have a good hedge of the former, the plants of which were obtained in this way. When such are used, they are cut down to within a few inches of the ground, when they are planted. The Prim and Cherokee rose are readily propagated by cuttings. They may be planted on the site of the intended fence, if the ground is properly prepared, and afterwards kept clean. The alder and white birch are best taken in stools, or single plants, from the grounds where they grow, and where they are to serve as a fence. The Japan quince, as we before observed, may be propagated by cuttings of the root. But as regards the wild crab, the honey locust, the beech, Osage orange, elm, buckthorn, and generally the common thorn, the principal reliance is to be had upon plants raised from seeds in the nursery. Plants of the European hawthorn are annually imported in quantities. They are obtained in Great Britain at two shillings or two shillings and sixpence per thousand, one year old. The seeds of the thorn, of the wild crab, of the red cedar, of the buckthorn, and of the beach, may be gathered in the autumn, and do best if immediately planted. They will not generally grow till the second spring, except the crab, and perhaps the beach. These seeds may all be preserved and planted in the spring, and in that case they should be so kept that they do not heat. The seeds of the elm should be gathered as soon as they fall, which they do here the last of May, and be immediately sown. They grow quick, and attain six to twelve inches height the first season.

The seed beds should consist of rich earth, well dug, pulverized and raked. They should be from three to four feet broad, to permit their being easily wed. The seed may be sown either broad cast upon them, or in drills from twelve to eighteen inches apart, pretty thick and covered with an inch or more of good mould. The seed beds should be kept free from weeds, and after a season's growth, the plants should be thinned, and either the stronger ones placed in nursery rows, three feet apart, and with intervals of one foot in the rows — or the smaller plants should be drawn, so as to leave intervals of three or four inches between those remaining, and pricked out in separate beds. If plants are left more than one season in the seed bed, where they stand thick, they grow slender and feeble, their roots are contracted, and they are not likely to do well

when put in hedge. Plants are more profitably put in hedge when they have attained the size of the little finger, which is generally at the end of the second or third season's growth. When transferred from the seed beds, the tap roots should be shortened to four or six inches, in order to induce the plants to throw out side roots, or to multiply them close to the stem. The whole of the plants ought to be removed from the seed beds the second year, and their roots shortened, though they be not large enough to put into the hedge. Plants are more easily taken care of in nursery than they are in hedge, and should therefore be kept in the former till they are strong enough to shoot with vigor.

We append to these remarks, Thomas Main's mode of growing the haws of our indigenous thorns, the first season after they are gathered. Mr Main was a practical nurseryman, residing in the District of Columbia. He raised large quantities of quicks, many of which were purchased and planted in the neighborhood of Troy. The statement is entitled to full credit. We copy it from the American Farmer of 1821 : —

"The seeds," says Mr Main, "are to be extricated from the berries, either by hand rubbing, or any other means. I commonly put them in a trough, and mash them with a wooden pestle, taking care to proportion the strokes thereof so as not to break the stones, and turning over the mass repeatedly during the operation, until all the berries are broken—after which the stones are to be washed from the pomace. Put a gallon or two of the mass into a washing tub, filled with water—let it be well broken and rubbed by the hand therein—pour off the water gently—the pomace and light stones will flow over along with it, and the good seed will remain at the bottom. It will be necessary to repeat this, say ten or twelve times, until scarcely any thing remains but the clean stones. They are then to be put in a deep square box, that will hold them with ease, so that the quantity of seed may not reach within some inches of the brim. The box ought to be loosely made, or a few gimlet holes bored in the bottom, to permit the water to drain from the seeds. It is then to be placed in some secure situation out of doors, in the coldest exposure that is convenient; and the seed in the box being covered with some moist oak leaves, or green moss, they are to remain so during the winter. Ground squirrels and mice are fond of these seed; the box ought, therefore, to be secure from these

animals. It is not necessary to mix any mould with the seed, neither is it material how often or seldom they are frozen during the winter.

"At the approach of spring, the seed are to be inspected every two or three days, say about the middle of March, [middle of April in lat. 42°,] and as soon as they feel slimy on being handled, it indicates that the shells of the stones are about to open. The weather being favorable, the ground is then to be digged and prepared for the reception of the seed. So soon as the small point of the rootlet of *some of the seed* appears protracted, it is then just the time, weather permitting, to sow them. Every gardener knows that the beds ought to be about four feet wide, and that the alleys should be from fifteen to eighteen inches. The seed ought to be rolled in plaster of Paris at the time of sowing, and scattered about an inch apart—half an inch of fine mould is sufficient for their covering. The plants will appear in a few days, if the weather is favorable. It is scarcely necessary to add, that to produce fine plants, clean and careful weeding is indispensable. It will save a whole year's trouble and time afterwards. The process may be summed up in one short sentence: Clean the stones from the berries, and keep them damp through the winter."

We now add, from the same excellent and pioneer agricultural periodical, conducted by John S. Skinner, John Taylor's, of Caroline, Va., method of forming a red cedar hedge:—

"The cedars should be transplanted in the three winter months, and in March. [We will venture to recommend here, March, April, and May.] They should be taken up [in the fields,] in a square sod, of the size of a spade, and deposited in a square hole to be made with a similar spade, without breaking the sod in which the young cedar stands, so as to fit as nearly as possible. Any little crevices made by not filling the hole exactly, are to be well closed, with part of the earth coming out of this hole, and the rest of this earth is to be crumbled close around the young cedar. The sod with the young cedar is to be taken up as deep as possible, in doing which the spade ought to be driven perpendicularly into the ground on three sides of the young cedar, but a-slant on the fourth, so as to cut the tap root, lest in raising the sod this tap root should hold the cedar, and so loosen its roots. The smaller the cedars are, the better. This will aid the closeness of the hedge at bottom. The

cedars are also to be two feet apart in the rows, but instead of standing opposite to each other, [for they are recommended to be planted in double rows,] across the fence, those in one row are to be placed opposite the centre of the vacancies in the other. At one year old, they should be topped with garden shears to one foot high, and the side branches clipt to within six inches of the stem. This is to be done yearly or half yearly, except at each dressing the cedars are to be left four inches higher and wider, until they acquire the height and width at which they are to be kept by yearly dressings. As some branches become too large for garden shears, the person dressing the hedge has a knife made of a piece of an old scythe blade, [the bill hook is better than either,] to cut off these. An annual dressing is indispensable to the thickening of the hedge. The richer the ground the sooner the hedge will arrive at perfection."—*Cultivator.*

Art. IV.—*Enkianthus Quinqueflorus.*

It is seldom we have an opportunity of noticing a more beautiful plant than the *Enkianthus quinqueflorus*, in the Conservatory of Hon. T. H. Perkins, which has now been flowered the third time by Mr William Cowan. It has also been flowered in the establishment of the Messrs Loddiges, London, from whence the plant was obtained.

The specimen under notice is about six feet high, of an erect habit, something similar to the *Arbutus ;* on the top of the branches are several twisted floral bractea of a transparent pink color, prettily pencilled with a dark red approaching a purple ; from these tufted clusters, the flowers, five in number, hang in a pendulous manner about an inch long, the strig of which is a beautiful coral red having a small bractea or floral leaf attached to it—the corolla or flower cup, is *campanulate* or bell shaped, with five segments revolving upwards, of a light pink color—the calyx is five parted, which clasps the corolla or flower-cup in a close manner from between each segment of the calyx—at the base of the flower are five nectarea, containing honey of a transparent red, tinged with purple, which, when the interior of the flower is examined, has a light red transparent color—but if shaded it gives a purple color—the stamens are

yellow and the apex of the stigma, contrary to most flowers, is of a green color.

The Enkianthus is a native of China, and is used by the Chinese as a decoration in their houses on festive days. The plant here is a hardy green-house, and thrives in a compost of peat earth mixed with sand and leaf mould. In the propagation, Mr C. has been successful in striking cuttings under a cap glass, in a compost mixed of sharp sand and peat mould.

Art. V.— *On the General Management of Forcing Frames and Forwarding Early Vegetables.*

The season being now advancing for forcing early vegetables, I herewith subjoin some papers that have been written at different times, when opportunities have offered to the most advantage on the subject.

Before I enter into a general method of forcing frames, it will be proper to give some directions of size and form of frames best adapted to the purpose. Where many frames are required, the best method is to have two sizes; one for early and the other for late forcing. The size that I would recommend for early forcing will be to make a frame of three lights or sashes; the frame to be of the following dimensions, viz: the length to be the same as plank from twelve to thirteen feet back and front, the width to be five feet, the depth in front ten inches, in the back eighteen inches, which is to be sloped at the ends — which will give a good slope for the purpose; the second size for general cropping may be made of the same length, but one foot under and a little deeper at the back and front.

Compost for Forcing Frames. It will be proper, at all times, to have a quantity of well incorporated compost for framing, which should be of such a quality as to answer most purposes; for which the best method is to procure a quantity of the top sod of a rich loamy pasture; to two cart loads of this add one cart load of good rotten manure, and if a quantity of leaf mould is incorporated therewith, the better; when the compost is collected, it may be formed into a regular heap and turned over two or three times during the

summer, and if not wanted to be used may be often turned in the winter.

This compost will answer most vegetables, with the exception of adding some maiden-loam for melons, and a quantity of sharp river sand for radishes and the like. It will be proper to have at hand a quantity of sand-leaf-mould, maiden-loam, and the like, to mix with the other composts, that may be wanted for different purposes.

Preparing the Materials and making the Hot-bed. Having pointed out the method of adapting the size of the frames, and compost proper for forcing frames, the next thing is the preparing and collecting the materials for the hot-bed. The best material for this purpose, is a quantity of hot horse manure from the stable, with about one half good oak or other leaves, that have been collected in the fall, mixed therewith; however, if the leaves are not at hand, horse manure will do. Having procured the proper quantity, it is to be thrown into a heap and well shaken together with a fork, and beaten moderately close on the outside, with the back of it—but not trod with the feet. So soon as the heat begins to ferment, which will be in a few days, it is again to be turned and well mixed in the same manner, and the same process may be followed three or four times, until the whole is in a lively state of *fermentation* and the rank *heat is passed off*, when the bed is to be made in the following manner.

The making the Hot-bed. The first consideration is to select a well sheltered situation, facing to the south, for making the bed; having selected the place, the ground is then to be measured off for the bed, a foot larger all round than the intended frame; this done, the bed is then to be made, by shaking the manure well together, and beating it down with the back of the fork — keeping the sides in a neat, compact, upright manner. The same process may be followed for all kinds of plants to be forced, and the height of the bed will depend on the season and the heat required for different plants.*

FORCING THE CUCUMBER.

Making the Seed Bed. To obtain early cucumbers, prepare some

* In all cases the bed should be made in as mild weather as possible, and the turning the manure the same: if done in cold days it often gets chilled, and it is very difficult again to recover the heat.

good horse manure as before directed, to make a seed bed, preparatory to the fruit bed. A one light box or frame five feet by three, will be large enough for the purpose. Commence the bed as before directed, in a warm, dry southern aspect — on a level surface; the bed may be made from three to four feet high. The bed being made the frame is to be placed on it, facing to the south, and covered in order to draw the heat, which when it rises the inside is to be covered six inches deep with light soil, and a thermometer placed at the back of the frame to try the heat, which should be from sixty to sixtyfive deg. by night, and from seventy to seventyfive deg. by day, sun heat, when the seed may be sown in the following manner.

Sowing the Seed. Some light, rich earth should be prepared for sowing the seed, which, when sifted fine, may be put into pots nine inches in diameter. When the pots are filled with the compost, they are to be put into the frame to warm the earth, and the following day the seed may be sown, about an inch apart in the pots, and lightly covered; the pots may then be plunged in the earth nearly up to the rim, if the heat is not too powerful, but in case of a burning heat the pots may be placed on the surface of the earth. The frame will now require to be regularly attended to, by giving *air* of a morning and taking it away of an evening, and keeping the temperature as near as possible as before directed; if there is much steam in the bed, a little air should be left, by night, at one corner of the back of the frame, to pass it off, as too much steam is very injurious to the young plants of Cucumbers.

Potting the Plants. When the plants are eight or ten days old they will be fit for potting off, which must be done in a fine day, about twelve o'clock; for the purpose, some light, rich earth may be prepared, and some pots the same size as before named — the pots may be about half filled with soil, when the plants may be taken carefully from the seed pots, and these plants may be carefully put into each pot, in a triangular manner, when the pot may be filled with soil to the rim.

In the operation of potting, care must be taken not to injure the plants by letting in the cold air: the potting should be performed by lifting up the sash at the back of the frame and covering the sides with bass mats.—(*To be continued.*)

Art. VI.—*On laying out Gardens and Ornamental Plantations.*

LAYING OUT APPROACHES AND PLANTING SHRUBBERIES.

In laying out approaches to the mansion or country residence, some taste is required to give an easy, graceful appearance and convenient entrance.

There is a class of respectable residences within a few miles and in the environs of towns and cities, that are particularly deserving notice of this kind, and combine more to enliven the landscape scenery around, than any other plantations, when prettily planted and ornamented, and give a *foreground* to the surrounding country of the most pleasing nature.

In laying out such places, one principal object is that the entrance or carriage-road be of an easy approach and so contrived as to appear convenient, *and really necessary to be exactly where it is laid out.*

If the house is near the road side and a square piece of ground before it, adjoining the road, which is often the case, an entrance forming a semicircular carriage-road with a gate at each end, has a very pretty effect. In such grounds the front part next to the road, may be appropriated to a grass plot or *lawn*, planted with a few ornamental trees, as the Balsam Fir, Mountain Ash, and the like, which gives a relief to the carriage road that will pass close to the front door, and have an appearance of easy access to and from the house to the carriage. The two side pieces of ground next to the house, on the left and the right, should be neatly planted with forest and shrubs: Balsam Firs, mixed with Mountain Ash, Maple, and the like, will serve an excellent purpose for the back or outline; the facing should be gradually brought down to the front with dwarfter kinds of evergreens, and deciduous shrubs, and the Rose, to within three feet of the margin of the carriage road, which will require to be bordered with a grass verge, six inches wide. At the front of the shrubs, many pretty kinds of hardy herbaceous plants may be planted to give a neat and pretty effect, and the whole, if well managed, will have a most happy appearance.—(*To be continued.*)

Art. VII.—*On the Propagation of half hardy and soft wooded Green-house Plants.* By W. H. St. Clair.

In a former paper I detailed the method practised by Mr M. Phail, in propagating pinks. At that time I did not wish to occupy too much of your pages in one article, I beg now to subjoin a few more remarks on the method in question; for some years past I have entirely discontinued the use of hand glasses in propagating any soft wooded green-house, or half hardy plants, that have fallen under my charge, and, except when I have occasion to propagate early in the spring, I find Mr Phail's method is a far surer mode of propagating, than by using hand glasses, or giving cuttings the "gentle bottom heat" so highly recommended by some. In propagating cuttings under a hand glass, a shady situation is generally selected, and great care is taken to keep off the sun's rays from affording the least heat to them; this is easily done, for a more unfit form for raising heat, than a hand glass has, cannot be well imagined; it never occurs to the person who uses them in propagating soft wooded plants, that a volume of cold moist air is not as good for raising cuttings as one fourth the same quantity of moist heated air is; in like manner, in propagating under frames, the sun's services are almost entirely dispensed with, a bottom heat substituted, in place of them; in Mr Phail's method, cuttings are forced in a comparatively short time to send out roots, and though a few cloudy days together may seem to argue against it, no bad effect, from such a cause, has ever fallen under my notice. In selecting cuttings for this mode of culture, I use only young, or at most half ripened cuttings, detaching them with the hand from the parent plant when practicable, and after trimming off a few of the large leaves, I insert the heel, or lower joint of the cutting; I give the frame a full south aspect, and raise it a few inches as directed for pinks; I allow only two or three inches between the top of the cuttings and the glass, and give them no air till they have given evident proofs of their having struck root, I shade the sash with several folds of net, pieces of paper, or a thin mat, removing it between four or five in the afternoon; on giving a good watering at planting I find very little more suffices them for the first fortnight, owing to the sash being kept close down; when rooted, I increase the air gradually. I have used frames of all

sizes, from one of six inches by nine, to one of six feet in length, and except that I find it more difficult to equalize the temperature in a small frame, I find little difference in the success of the cuttings. I must add, however, that a large sash requires the shading to be a little closer than a small one. If a mixed collection of cuttings is to be put into the same frame, they should consist of such as require about the same time to strike root, and by mixing up a compost of light loam, vegetable mould or peat and sand, under the treatment detailed above, a good many kinds may be propagated in the same frame.

Before concluding, I beg leave to enumerate a few of such sorts as yield most readily to this mode of treatment, and such as I have propagated for the last three years. Pinks, Carnations, Geraniums, (tricolor included,) Sollyas, Myrtles, Cistuses, Calceolarias shrubby and herbaceous, Fuchsias, Pansies, Salvias, Verbenas, Lophospermums, Petunias, &c.; from the certainty and facility, with which the above and many other plants of similar habits may be propagated, I have no hesitation in recommending the method to any of your readers who may feel inclined to try it, and I have every reason to think, if they try it once with cuttings, and subject those cuttings when potted, to similar treatment for about ten days, they will be induced to try the same method again. — *Floricultural Cabinet.*

Art. VIII.—*On the Sensitive Plant.*

The movement of the leaves of the Mimosa Pudica have their origin in certain enlargements, situated at the articulation of the leafets with the petiole, and of the petiole with the stem. Those only which are situated in the last articulation are of sufficient size to be submitted to experiment. If, by a longitudinal section, the lower half of this swelling be removed, the petiole will remain depressed, having lost the power of elevating itself: — if the superior half be removed, the petiole will remain constantly elevated, having lost the power of depressing itself. These facts prove that the motions of the petiole depend on the alternate turgescence of the upper and lower half of the enlargement, situated at the point of ar-

ticulation : and that contractibility is not the principle of these motions.

If one part of the plant be irritated, the others will soon sympathise, or bear witness, by the successive falling of their leaves, that they have successively felt the irritation : — thus, if a leaflet be burnt slightly by a lens, the interior movement which is produced will be propagated successively to the other leaflets of the leaf, and thence to the other leaves on the same stalk. A very clever French experimentalist, Mons. Dutrocht, found,

1st — That this interior movement is transmitted equally well, either as ascending or descending.

2nd — That it is equally well transmitted, even though a ring of bark has been removed.

3rd — That it is transmissible, even though the bark and pith be removed so that nothing remain to communicate between the two parts of the skin : except the woody fibres and vessels.

4th — That it is transmissible, even when the two parts communicate merely by a shred of bark.

5th — That it may be transmitted, even when the communication exists by the pith only.

6th — But that it is not transmissible, when the communication exists merely by the cortical parenchyma.

From these very interesting experiments, it results that the interior movement produced by irritation, is propagated by the ligneous fibres and the vessels.

The propagation is more rapid in the petioles than in the body of the stem : — in the former it moves through a distance of from three to six tenths of an inch in a second ; in the latter, through from eight to twelve hundredths of an inch, during the same portion of time. External temperature does not appear to exert any influence on the rapidity of the movement, but very sensibly affects its extent.

Absence from light, during a certain time, completely destroys the irritability of the plant. Such change take place more rapidly when the temperature is elevated, than when it is low. The return of the sun's influence readily restores the plant to its irritable state. It appears, therefore, that it is by the action of light, that the vital properties of vegetables are supported, as it is by the action of oxygen that those of animals are preserved, consequently, etiolation is to the former what asyphxia is to the latter.— *Gardener's Gazette.*

Art. IX.—*The Forest Treasures of Guiana.* By C. Mackenzie.

Having arrived at 2 degrees 36 1-2 minutes north latitude, Mr Schomburgk, on account of the approach of the rainy season, and the breaking out of intermittent fever among his party, gave up all idea of exploring the Rupunoony to its sources. The region in which he now stood, was surrounded by mountain ranges, within whose circumferencc and interstices were vast savannahs of a whitish clay, covered with numerous grasses and plants. The river, (which is of a milk-white appearance, from passing over the clay in question,) meandering through these extensive plains, marked its course by a fringe of fruit and forest trees; indeed, similarly fringed are all the small streams, of which the Rupunoony is the recipient; and thus the monotony of a savannah is greatly relieved. Numerous deer, but never in herds, graze here undisturbed.

One of Mr S.'s chief intentions, in ascending the Rupunoony, was to find, if possible, the plant from which the Indians prepare their celebrated *Ouralie* or *Wourali Poison;* whilst at the Lower Rupunoony, he had frequently been told that it grew on the Conocon mountains; and he now found that a journey of about a day and a half would bring him there. Guides being engaged from the encampment of Aripay, he started on the morning of the 25th of December; his way first led to the South, over pathless savannahs, fording the Rupunoony at a convenient spot; then through a tremendous mountain-pass, at the further end of which lay an extensive arid savannah. He then turned to the north, through plains covered with wood, shrubs, and coarse grass, and bounded on all sides, by rugged mountains. At the distance of about five miles on this wild and solitary road, which was frequently intersected by the mountain streams, his ascent commenced. The path, Indian-like, led over fallen trees, and between boulders of granite; and it was frequently so steep, that the party had to use hands as well as feet. After a march of eight hours and a half, they reached a settlement of Warpeshana Indians, the chief of which (Oroonappy having before met M. Schomburgk at a Piwarrie feast,) showed great joy at his arrival, and treated the whole party with the greatest hospitality. Among other things, he despatched one of his attendants to his

field, who soon returned, loaded with some of the finest sugar-canes Mr S. ever saw: indeed, the fertility of the soil in this spot was astonishing, although the height was from 2300 to 2500 feet above the plains below; the size of the plantains, and the sweetness of the bananas, greatly surpassed those of the plains; and the dark or purple banana, so much esteemed in the colony for culinary purposes, grew here in the greatest degree of perfection. The cotton, likewise, which grew around this chief's house, was of excellent quality; nevertheless, the fertility of the soil profits only a few; for, the difficulty of the ascent, and the distance, seclude the inhabitants from those in the valleys; consequently, the productions of their fields rot on the ground, and become useless to man.

Next morning, though greatly dissuaded, he continued his journey over hill and dale, mostly in a north-west direction. The path was exceedingly difficult, and Indians only could have guided him; they directed their course mostly by broken branches and by *marks* cut in the trees; sometimes hesitating for several minutes as into which direction they should turn. About noon our traveller passed a Maran tree—the *Copaifera Officinalis;* it was very lofty, with light grey bark, a fine branching head, and pinnated leaves. The Indians cut a semi circular hole towards the bottom of the trunk, and to the very heart of the tree. At certain seasons, chiefly in February and March, the balsam flows abundantly, and fills the hole in the course of a day; next morning it is put into calabashes,when it immediately forms an article of barter and sale with the colonists. Mr S. found a large quantity in the hole of this tree, which was of a yellowish color, and quite clear; the Indians eagerly anointed their bodies and hair with it. The medicinal qualities of the balsam of Copaiba are too well known to be mentioned here.

At length the Indian guides stopped in one of the glens, near a spring; and going towards one of the ligneous twiners, which wound themselves, snake-like, from tree to tree, called out "OURALI!" which is the name of the plant in the Warpeshana dialect. The stem of this very extraordinary vegetable production, is often more than three inches thick, and very crooked; its bark is rough, and of a dark greyish color; the branches thin, and inclined to climbing; the leaves dark green, and opposite, ovate, acute, five-nerved, and veined; the young branches and leaves hirsute or hairy; the hairs brown; the fruit of the size of a large apple, round, smooth,

and bluish-green, and the seeds embedded in a pulp, and consisting chiefly of a gummy matter, which is intensely bitter. Mr S. saw many heaps of the cut wood, covered over with palm-trees and leaves, which had been thus left by parties of the Macoosie Indians. The "OURALI" grows only in two or three places, which are resorted to by Indians from all quarters — often, indeed, from a great distance. Our traveller cut some of the sticks, which he carried away, and returned to the habitation of his friend Oronappy, after an absence of eight hours. He was highly delighted that, though he could not behold this singular plant in all its stages of growth, he had succeeded in collecting a few of its fruits. He has sent a very full description of the plant, with the Indian mode of preparing the poisoned arrows, to the Linnæan Society of London. His description of the latter, however, being taken entirely from the hearsay of his guides, is exceedingly deficient and erroneous, inasmuch as he has not stated that the *ourali* juice, in its *natural state*, is neither poisonous nor hurtful to the animal system; and that it derives its noxious qualities from *fermentation* and *mixture with other vegetable juices*. In fact, the Indians are exceedingly chary of giving any real information respecting their mode of manufacturing the *ourali poison*; and were it not for Dr. Hancock's long residence among them, and his keen anxiety to become acquainted with all their botanical secrets and medical practice, the scientific world would still be in ignorance on the subject. The fermentation of the juices, as well as the domestic medical practice generally, is in the hands of the elderly Indian females: these *doctresses* (from his peculiar situation among them, as well as from the great confidence which they put in his professional knowledge and discretion) were Dr Hancock's instructers in this important matter.

Leaving the Ourali district, Mr Schomburgk and his attendants descended into the savannahs by following the course of the river Maou, whose waters are of a coffee-brown color. Among the mountains, between which it has forced its course, it is about sixty yards wide, and its valley forms a peculiar mountain scenery, very picturesque, but by no means fertile. It is inhabited by Macoosies.— In April, these savannahs are inundated, presenting the peculiar feature of the waters of the Rupunoony and Maou, (the one milk-white, and the other coffee-brown) being *commingled;* and the extent to which their inundation amounts, has given rise to the fable

of the "*Lake of Parina.*" At this season of inundation, an inland navigation may easily be carried on between Demerara and Para; and several large groups of trees, which, during the dry season, rise like *oases* out of the savannahs, form small islands during the inundation: two of these groups are not far from the borders of the lake so called; and these, without doubt, are the "ISLAS IPOMUCENA," described by Don Antonio Santos. All the groups or islets consist of accumulated sand, mixed with vegetable earth — the drift matter of the currents during the inundation. The soil being richer than that of the surrounding arid district, seeds of various sorts of course, first sprang up; these being able to withstand the force of the currents, assisted in forming a large accumulation of *detritus* and seeds. These hillocks, however, though raised scarcely more than from ten to twelve feet above the savannah, have each their peculiar *floras*, consisting of the *Inga unguis cati*, several cassiæ, large *cacti*, which raise their limbs like gigantic candelabra, and a species of night-blooming *cereus*, which interlaces the other trees and plants. These are the chief botanical features of the *oases* in question, but on one of them Mr Schomburgk found several *cashew trees*, (*Anacardium occidentale,*) in full bearing. Such a discovery is most welcome to the parched traveller, when water is scarce; but the fruit, unprepared by proper cookery, exercises the most deleterious effects on the constitution.

ART. X. — *List of New and Rare Plants.* Noticed by the Editor of the Floricultural Cabinet in England.

1. *Lupinus Versicolor.* (*Party colored Lupine.*) Leguminosæ. Diadelphia Decandria. A hardy perennial species, a native of California, and has bloomed in the garden of the London Horticultural Society. The stems grow about two feet high, much branched. The flowers are produced in terminal spikes; the blossoms are variable between rose-color, pale blue, violet, pink, and greenish white, on the same raceme, but the lighter colors are generally towards the top of the raceme. It is a beautiful flowering species, and well deserves a place in every flower garden. The flowers are fragrant, something like the perfume of the field bean. It blooms from May to July, and produces abundance of seeds.

2. *Platystemon Californicus.* (*Californian.*) Papaveraceæ, Poyandria Polygynia. A hardy annual introduced into this country by the late Mr Douglas. The plant grows about eight or ten inches high, branches terminating with pale straw colored blossoms, each about an inch across. The flowers much resemble the wild wood Anemone of Britain, only differing in color. *Platystemon* from *platus* broad, and *stemon* a stamen, alluding to the broad filaments.

3. *Rhododendron Arboreum var. Cinnamomeum.* (*Cinnamon colored tree Rhododendron*) Bricaceæ, Decandria Monogynia. In 1822 Dr Wallich sent to this country, from India, a quantity of seeds of this plant, one of which has bloomed in the nursery of Messrs Rollinson at Tooting, Surrey. The present variety is very like the white sort which has previously been noticed and been cultivated in our gardens for ten or twelve years, but the clusters of flowers are more compact, and the purple spots on the white petals are larger, darker and more numerous. The white of the flower is not so clear as in the old kind. The present kind deserves a place in every shrub border.

4. *Blumenbachia Multifida.* (*Multified-leaved.*) Loasæ. Polydelphia Polyandria. A native of Buenos Ayres, and discovered there by the late Dr Gillies. It has since been discovered by the late Mr Tweedie, and by him seeds were sent to the Glasgow Botanic Garden. This species is very distinct from B. insignis, being a much stronger growing plant, more compact, and more hisped with strings. It is perfect hardy. The leaves are much larger, but like B. insignis, they are much lobed. The flowers are an inch across, white, with a yellow, and red centre.

5. *Brodiæa Grandiflora.* (*Large flowered.*) Liliacia. Triandria, Monogynia. A bulbous rooting plant, a native of Georgia, on the north-west of America. Bulbs were sent by the late Mr Douglas, to the London Horticultural Society. The flower stem rises to eight or ten inches high, terminating with an umbel of about six flowers; each flower is campanulate, about an inch across, of a pretty blue color. It is quite hardy and flourishes freely if grown in a shady situation, and planted in peat soil. *Brodiæa*, named in compliment to James Brodie, Esq., of North Britain.

6. *Silene Chloræfolia.* (*American catchfly.*) Silenacœ Decandria, Trigynia. A hardy perennial plant, producing numerous

pretty flowers, of a pure white, delightfully fragrant. Each flower is rather more than an inch across. It is a most desirable plant for either the flower border or a rock work.

7. *Cereus Akermannii.* (*Akermann's Mexican Cereus.*) Cacteæ. Icosandria Monogynia. This splendid flowering plant has generally been considered a hybrid between C. speciosa and speciossimus, but seeds of the original plant were first sent to this country from Mexico. The flowers are as large as speciocissimus, of a fine reddish scarlet color, but destitute of the fine azure color which tinges the flower of that species.

8. *Cowania Plicata.* (*Plated-leaved.*) Rosacia Icosandria Polygynia. An hardy evergreen, much branched shrub, a native of the uplands of Mexico. The blossoms are about an inch and a half across, of a rich rosy lilac color. The flower in form very much resembles a single rose, of the size stated. They are produced numerously, and make a showy appearance. The plant is a valuable acquisition to our dwarf shrub; the plant was raised from seeds by Mr Thomas Blair, Gardener to Mr Clay, Stamford Hill. *Cowania,* in commemoration of the late Mr James Cowan, who introduced into this country a number of interesting plants from Mexico and Peru.

9. *Cypripedium Purpuratum.* (*Purple stained Lady's slipper.*) Orchidaceæ. Gynandria Diandria. This new species has been recently introduced into this country by Mr Knight, of King's Road, Chelsea, from the Malayan Archipelago. It has bloomed in the collection of Messrs Loddiges of Hackney Nursery. Its purple flower has a very pretty appearance. The foliage is very much like that of C. venustum.

10. *Gesneria Lateritia.* (*Brisk-colored flowered.*) Gesneriaceæ. Didynamia, Angiospermia. This species is a native of Brazil, received from that country to the London Horticultural Society's Garden, in 1832, and has bloomed in the plant stove at that place. The flower stem rises about two feet high, producing a number of brick-red flowers, each about an inch and a half long. This species has, till very recently, been considered to be Gesnera Sellowii, but it is now ascertained not to belong to the section of Gesnera, to which G. Sellowii belongs, but to that of G. bulbosa. Gesneria, so named in compliment to Conrad Gesner of Zurich, who died in 1565.

Gesneria Lindleyi. (*Dr. Lindley's Gesneria.*) Synonym, G. Rutila, var. Atrosanguinea. This handsome flowering species is a native of Brazil. It differs from G. rutila in many particulars. That species has axillary, solitary, flowers and has a wider mouth. The hypogynous glands are only two, whereas in G. Lindleyii they are constantly five. The flowers of this latter species are of a bright scarlet color, each about an inch and a quarter long; they are produced numerous on a raceme of near two feet long. The flower stem rises from three to four feet high.

6. *Grabowskia Boerhaavlæfolia.* (*Boerhaavia-leaved.*) Solanaceæ. Pentandria Monogynia. Synonyms. Lycium Boerhaavifolia. Lycium Heterphyllum. Ehretia Halimifolia. A spinous shrubby plant, introduced to the London Horticultural Society's Garden, from Brazil, where it is a common shrub in the woods and fields, and grows to the height of eight or ten feet. It has been found hardy enough to bear the open air of this country, when trained against a south aspected wall. It is a very branching shrub, with leaves much resembling those of Psidium Catleyanum. Each flower is about half an inch across, of a pale violet-blue. They are produced in small branching panicles. *Grabowskia* in compliment to Mr N. Grabowsky, an Apothecary at Ohlaf, an author of a work on flowers.

13. *Lobelia Cavanillesii.* (*Cavannilles's Lobelia.*) Campanulaceæ. Pentandria Monogynia. Synonym, Lobelia Persicifolia. A native of New Spain, and requires to be grown in the stove in this country. It blooms in August and September. It is an herbaceous plant, having a flower stem about a yard high, with scarcely any branches. The flowers are produced numerously, upon long foot-stalks. Each flower is about an inch and a half long of an orange-red color. The stamens are united their whole length, and form a long red tube, which adds to the beauty of the flower. The plant has bloomed in the Glasgow Botanic Garden. *Lobelia* in compliment to Mr Lobel.

14. *Lobelia Siphilitica*, var. *Millerii.* (*Miller's blue American Lobelia.*) Lobeliaceæ, Pentandria Monogynia. This beautiful flowering hybrid has been raised from seed, between L. siphilitica; and L. fulgens; or L. splendens, or some fine scarlet flower. The color of the flower is the blue of the former, with the fine scarlet of crimson of one of the others. It is quite

hardy, and produces numerous flower stems rising to the height of two feet, which continue in bloom from July to the end of summer. The plant deserves a place in every flower garden. We have twelve other fine varieties.

15. *Maxillaria Steeli.* (*Mr Steel's.*) Orchidaceæ. Gynandria Monandria. Synonym. Maxillaria Flagellifera. It is a native of Demerara, from whence it was introduced in 1835. The plant is of a very singular growth; the stems are pendulous, and the leaves are very long, extending three or four feet. They are like so many very strong rushes. The flowers are produced solitary, each rather more than two inches and a half across. They are yellow, irregularly spotted and striped with large spots, and stripes of dark purple. The labellum is of a sulphur color with dark purple veins, altogether singularly handsome. The plant has bloomed in the collection of Messrs Loddiges's of Hackney.

In the Botanical Register, Dr Lindley has noticed the following new species of Maxillaria, viz. 1, Maxillaria Rollissoni, in Messrs Rollisson's collection, at Tooting Nursery. The flowers are of a pale Lemon color, with the Labellum dotted in the middle with fine p urpl e.

2. M. acicularis; a native of Brazil, in the collection of the Honorable and Reverend W. Herbert. The flowers are of a purplish chocolate color.

3. M. uncata; a native of Demarara, in Messrs Loddiges's collection.

4. M. chlorantha; a native of Demarara; in Messrs Loddiges's collection. The flowers are of a yellowish green, small; they are sweet scented.

5. M. variabilis; a native of Mexico. The flowers are small of a deep purple color. This species has been known by the following names M. atropurpurea, M. concinna.

6. M. tenuifolia; a native of Mexico. The flowers are of a rich purple, spotted, and broken into small yellow patches.

Art. XI.—*Winter Scenery of the White Mountains.*—No. I.

A residence of a few weeks in a flourishing and pretty town, about eighteen miles distant from the range of the White Hills, has lately enabled the writer to visit that spot. Seldom any traveller, except the man of business, is wont to take such a journey, to gaze on the magnificent desolation of winter, which reigns for a greater part of the year over this region. Ascent of the principal peak, the lofty Mount Washington, is made when the bland zephyr and the tardy breezes of summer have fanned its sides, and wakened into life and beauty the alpine plants, which, in daring hardihood, peculiar to themselves, thrive and bloom amidst the waste of rocks and despite the influence of almost continual frost. I was informed, however, that the peak in question, was ascended on the latter part of November of the last year, immediately after a snow storm and on a very cold day, by an adventurous English gentleman, under the guidance of Mr Fabyan, who keeps the excellent house, formerly occupied by Mr E. A. Crawford.

It was in the evening of the second of January, that I rode down as far as the Willey House, through the stupendous rift of the "Notch." The moon was in silent beauty and majesty shining directly over the abyss, and silvering with its mild light the precipitous mountain cliff on either side. The evening star shone brilliantly over a range of peaks, now sinking for a moment beneath some culminating point, now twinkling amidst the feathery crest of shrubs and dwarfish trees, and anon resting as it were on some bold and bare level, according as I wended my way through the narrow defile. The dense and purer streaks of snow and ice down the ravines, denoted the desolating track of frightful slides produced by rains. Scarcely a sound broke on the ear. Nature was in its accustomed though silent beauty; the murmur and music of its thousand voices, of merry birds, and leaping, babbling brooks, and prancing waterfalls had ceased, under winter's imperious sway. And yet there was the music of harmony and perfection, the eloquence of creation, in the silent appeals of grandeur and sublimity. Deity was walking, as of old, amidst the scene; invisible spirits were in attendence to minister unto the higher capacities of man. I plucked a dried flower stem of the pearly "everlasting" from the

rude but proud mausoleum of the humle family, buried beneath the avalanche four years ago, and retraced my steps to " mine inn."

The mildness of the atmosphere denoted a change of weather; nor was I disappointed on the next morning to find the highest elevations enveloped in clouds and mist. A short but pleasant ramble enabled me to catch a glorious and extended prospect from the summit of Mount Vision, (or Mount Deception, as it is commonly called;) a hill rising to the height of seven hundred and ten feet from the adjacent plain. The precipice of the " Notch " was the only unclouded portion of the White Hills — over which the sun was just breaking from the vapor, and illuminating, with peculiar splendor, its snowy sides, while far down the gap, in the most distant horizon, a narrow but clear spot denoted fair weather beyond. It seemed a glimpse to some goodly and promised land, to the access of which, were intervening dangers and perils.

I observed the " hybernal vestiges " of many interesting plants; while numerous beautiful mosses and curious lichens were visible on the rocks, now dripping with the humidity of the morning. A species of Xylosteum seemed the most abundant plant, while the withered leaves of the diminuative *Cornus Canadensis*, and the tall peduncle of an *Actæa*, denoted the garniture of summer, — of which these were sad but lingering mementos. Further up, the broad footsteps of the gaunt and grim wolf, easily distinguished by the print of the two long claws projecting from the track, served as an excellent guide to the easiest ascent, while the recent marks of the timed hare, and the screech of the blue jay reminded me that life was busy even amid the seeming barrenness of winter. Nor was I unattended. A group of fairy minstrels, bedecked in a costume peculiar to their vocation and suitable to the inclemencies of the season, welcomed my approach. With their characteristic boldness, they twitted the cheerful "Chick a dee, dee, dee!" as they flitted from branch to branch, now near and now more remote; a simple lay, but eloquent and touching. They were the black-capped Titmice, the most agile and prettiest of native birds, so well known in winter; nor unobserved amid the gayer tribes of summer. What child has not noticed them or their song, when the fast falling snow drives them to the door step, or to the tall and dry stalk of the sunflower in the garden; now with clenched claws grasping a plump seed, and anon splitting it with

remarkable facility to extract the delicious kernel? A reception so gracious, was as pleasant as it was unexpected, and added in no humble degree to the enjoyment of the occasion. I could do no less than join in their cheerfulness and glee, for nature was imprinting on my feelings, the sensations of joy and the luxury of existence, which elicit the constant chorus of praise and gratitude to the Author of All. X

Art. XII.—*Agriculture in France.* By Dr. Humphrey.

The proportion of cultivated land is considerably greater in France than in England; owing partly to the different policy of the two governments, and partly to the different modes of living in the two countries. The French eat twice as much bread as the English, and the English, three or four times as much beef and mutton as the French.

In England, the farmers own but very little of the soil, and the peasants none—the land being nearly all held by great proprietors. In France, the actual cultivators of the soil own a great part of it. The departments are cut up into an immense number of farms, and of course, most of them quite small. With industry and economy, the French peasantry are able to subsist quite comfortably, but the greater part of them have very little to spare. The agriculture of the country is said to be in a prosperous condition, and I can easily believe it is from what I saw as I passed hastily through it in the month of June. The crops were certainly very fine, and there were many unequivocal proofs of good husbandry. Still, France does not compare at all with England, in scientific and practical agriculture, nor in the beauty and affluence of its rural scenery. The best husbandry in France, is in the south and in the north. In the former, the agriculturist is aided most by the goodness of the climate, and in the latter, by skill in the rotation of crops.

Wheat is the grand agricultural staple of France, as well as of England. Some districts through which you travel, seem to be almost covered with it. I am quite sure, that I never saw so much in any single day of my life, as from Rouen to Paris.

Next to wheat, *rye* is more extensively cultivated than other of the small grains in France. As we approached the capital, I saw

more of it than I had taken notice of any where else; not in great unbroken fields, but in small patches, many of them less than half an acre, and separated by narrow ridges thrown up with the plough, at the time of sowing. Barley is not very generally nor very well cultivated. The French do not want it. They like their own wines better than English beer.

The *sugar beet*, which was introduced by Bonaparte, when the victorious fleets of Britain were blockading the continent, still furnishes most of the sugar, which is consumed by the French people. The quantity of beets manufactured in 1835, according to the Minister of Finance, was 668,946,762 lbs., and in 1836, 1,012,780,589 lbs. The value of the raw sugar from the harvest of 1835, was 30,319,340 francs; and of 1836, 48,980,000. The number of manufactories was 542. This is probably a great saving to the country even in time of peace, and it renders France entirely independent of all the rest of the world in time of war. How we at the North shall succeed in making our own sugar, is yet to be proved. The beet flourishes well upon our soil, and I see not why the manufacture may not be carried to any extent, which the demand shall hereafter require.

It is but lately, that the French have found out the value of turnips for feeding cattle and sheep; and even the potato, that most valuable of all the farinacious roots of high latitudes, has not long been cultivated, even as a garden vegetable, in France. But at present, vast quantities of potatoes are grown in the provinces of Poitou, Normandy, Limosin and the Isle of France, and in less quantities in other districts.

The *vineyards* of France are estimated at about 5,000,000 acres, or *one-twenty-sixth* part of the territory; and they are so exceedingly productive, that the grapes form, it is supposed, about one-sixth part of its produce. They are commonly planted on rocky and inferior soils. The general routine of cultivation is as follows. The vines are planted promiscuously, from two and a half to four feet.—About the middle of January, they receive the first cutting. In March the ground is dug. In April and May, the *provins* or tender sprigs are planted. In June, the *seps*, or shoots, are hoed and tied to stakes with straw bands. The vines are hoed again in August, and the vintage takes place in September or October. The *Champagne* grape vine, it is said, will last 50 or 60 years. It is

never allowed to grow more than a foot and a half high, and is pruned about the end of February, pruned again, and tied or propped up in April or May; pared and tied in June; second trimming in July; third trimming in August; vintage in September or October. In Champagne, the grapes are put into a press, and the juice is obtained by two or three quick turns of a screw. "In *Provence*, the method of pressing is very rude and simple. A man, and commonly two or three children pull off their shoes, and jump into the vats, where they trample on the grapes till all the wine is pressed out."—I need not say, that immense quantities of wine are exported from France every year to England and to the United States; nor that if nine-tenths of it were mingled with the waters of the ocean, before it reaches either country, the loss to merchants and under-writers, would be great gain to consumers. What well man in a hundred who drinks wine, needs it? Who does not know, that "wine is a mocker," as well as that "strong drink is raging?"

Nothing is more painful than to think how large a proportion of the gross produce of the earth is, in christian countries, converted into poison, first to create and then to satisfy a raging appetite for narcotic stimuli. In this country the raw materials are chiefly *apples* and *rye;* in England, Scotland, and Ireland, *barley;* in France and Italy, *grapes;* in Sweden and all the north of Europe, various *kinds of grain.* Anything to "steal away men's brains," inflame their blood, scorch their vitals, madden their passions, consume their estates, beggar their families, curse the ground with their carcases, and send their immortal souls to perdition.

I forgot to say, in the proper place, that the agricultural implements in France are, for the most part, extremely imperfect in principle, as well as bungling in construction. The plough, for example, is almost entirely of wood, and so made as to scratch and push forward the soil, instead of turning it up in furrows. In the neighborhood of Toulouse, a better plough is seen of pretty good construction. The use of oxen in the plough is pretty general in France; and their yoke is a piece of wood, one sixth as heavy, perhaps, as one of ours. It is put across the foreheads of the cattle, the extremities being neatly hollowed out so as to fit the head, and lined with sheepskin or some other soft padding. This yoke is fastened to the horns with small leather thongs, and the beam of the plough being attached to the middle of it, the equipment for labor

is complete. In the harrows you will see no iron teeth, and the use of rollers is awkwardly supplied by a plank, on which a boy rides over the furrows. The carts which I saw would make you smile, they are so long and narrow and inconvenient. The loads are sometimes bound on with a sort of rude windlass, which it would be very difficult for me to describe. It is wonderful that a people of so much natural ingenuity as the French, and claiming to hold the first rank in all the fine arts, should plod on as they do, from generation to generation, with such implements of husbandry, as would hardly do credit to a tribe of half civilized Indians.

Art. XIII.—*Miscellaneous Matters.*

On striking and subsequent culture of the Orange and Citron. (By Mr W. Whale, Elcot Park, Newsbury, Berkshire.) I beg leave to communicate to you my mode of cultivating the Orange and Citron, which I have practised for many years with great success, which may be of service to some of your subscribers — that is from single eyes with a leaf attached to it; I immure the eye in the mould about half an inch deep, and they begin to make roots very soon, sending up a strong shoot at the same time. I have stuck fifty to a hundred in a large sized pot, and scarce one of them failed, and of course a plant on its own bottom is preferable to a plant introduced on another stock. When potted, they should be watered liberally, and introduced into dung heat and shaded. I find they strike most readily in a cucumber bed, the pots plunged to their rims. The compost I generally use is rich loam and rotten dung, the pots well-drained, and about three inches of soot at the bottom of the pot, if a little old mortar, so much the better. I also find the Dahlia strike very freely from single eyes, and much the best mode for summer propagation when you wish to propagate valuable seedlings, as they make strong plants by autumn. I also find Bignonias strike freely by the same method. If you think this worthy of a place in your Cabinet, you are welcome to publish it. — *Floricultural Cabinet.*

QUINCY MARKET.

[Reported for the Horticultural Register.]

APPLES, Russet,	barrel,	2 00	to 2 50	bushel,	1 00	1 50
Baldwins,	do.	2 00	2 50	do.	1 25	1 50
Golded Pippin				do.	1 50	
Common,				do.	75	1 25
BEANS, White				do.	2 00	2 25
BEETS,				do.	50	75
CABBAGES,				dozen	50	75
CARROTS,				bushel	50	75
CELERY,				root	6	10
CRANBERRIES,				bushel,	2 00	2 25
GRAPES, Malaga,				pound	25	37
HORSE RADISH,				pound	8	11
LEMONS,				dozen	37	50
LETTUCE,				head	10	12
NUTS, Almonds, (Soft shelled)				pound	7	8
(Hard)				do.	4	5
Filberts				do.	4	5
English Walnuts				do.	5	7
Castana,				do.	3	5
Pea Nuts,				bushel	1 25	1 50
Shagbarks,				do.	2 00	3 00
Chestnuts,				do.	5 00	5 50
ORANGES,				dozen	37	50
ONIONS,	bunch,	4 a 6		bushel	1 25	1 50
PARSNIPS,				do.	75	1 00
PARSLEY,				half peck	25	
PEARS, (Baking,)				bushel,	2 00	3 00
POTATOES, common,	bushel,	40	50	barrel	1 00	1 25
Chenangoes,	do.	37½	50	do.	1 25	1 50
Eastport,	do.	1 00		do.	2 00	2 25
SQUASHES, various sorts,				pound	4	6
SAGE,				do.	20	25
TURNIPS,				bushel	50	75

Remarks.—The markets appear to be well supplied with vegetables and fruits and common at this season of the year, and prices remain about the same as last month's. Potatoes are abundant at the prices quoted. Pears have disappeared with the exception of the winter baking. Onions are higher than usual at this season of the year. Of Cabbages there is a good supply. Squashes are getting scarce.

Boston, Jan. 26, 1838.